

REMARKS

The claims have been amended as needed so as to take care of the formal matters, and also to sharpen the definition of the invention relative to the applied references.

In particular, the reference numerals are now removed from the claims, because they proved to be merely confusing and in any event are unnecessary.

When reading the amended claims, it should be noted that they do not read on Figs. 1-4. The arrangement of Figs. 1-4 has no pivot arrangement between the two collars.

Claim 21 as amended now recites "a connections means, comprising **in combination** ... a pivot arrangement ... **and** ... an essentially inelastic connector of high tensile strength". The "connection means" is to be construed as a general term, referring generally to means for connecting the two collars together. This comprises two essential and distinct structural elements in a claimed combination, a pivot arrangement and an inelastic connector. The pivot arrangement provides articulation and separation between the two collars under a compressive load. The inelastic connector limits fetlock joint movement within said predetermined range of pivot rotation as the two collars pivot apart under a tensile load. Thus, in use, the two claimed elements of the connection means effectively **co-act** in opposition to one another when the collars pivot apart by virtue of the rotation of the fetlock joint.

It will be noted that changes have been made to claim 21 with a view to a more positive recitation of the essential integers of the claimed invention, in particular the "connection means". Unnecessary claim limitations have been removed for greater clarity and conciseness.

Claim 21 has been amended by deletion of "the inside of" ("an essentially inelastic connector of high tensile strength ~~(6,12,61,71,115)~~ connected to one or more points on ~~the inside of~~ each of said cannon bone-embracing collar"). This removes the formal objection of "new matter".

Claim 30 has been amended by the deletion of reference numerals "(91,104)". This removes the cause of the formal objection that "structures from species of different embodiments are being claimed in a single invention, which is however not described in the specification such as to enable one of ordinary skill in the art to make and use the claimed invention".

With regard to the objection that "means (91,104) on the inside of the support arranged to allow air to pass from the intake entrance over and adjacent the horse's leg" is indefinite, claim 30 has been amended so as to recite "channels" rather than "means". "Channels" have been described with reference to Figs. 21-23. The Official Action says it is not clear how the channels may be arranged on the inside of the collars when **tightened** on the horse's leg. Applicant has described the use of viscoelastic foam, and shock absorbent foam, on the inside of the collars.

These materials may be formed with channels which will still provide an air space between the collar and the leg when the collars are secured to the leg. In fact, the objection is not well founded, as nowhere in the applicant's specification is reference made to "tightening" the collars about the horse's leg, only to "securing" the collars.

Reconsideration is accordingly respectfully requested, for the rejection of the claims as unpatentable over CLAGG in view of BÖRENDT et al., and further in view of JOUTRAS, or still further in view of DETTY or BARD.

BÖRENDT describes a horse boot arrangement with a canon bone embracing collar **A** and a pastern bone embracing collar **B** connected together with a rubber ring (**a**) and an adjustable strap (**b**). The "connection means" between the two collars is therefore elastic or capable of stretching as the fetlock joint moves or rotates. The collars are essentially free to slip towards one another and must be pulled in this direction by the rubber ring when in use. No hinge or pivot separating the collars is provided. The purpose of BÖRENDT's arrangement is simply to prevent over-exertion or straining of the fetlock sinews against the limiting action of the rubber ring. However, BÖRENDT's rubber ring will undoubtedly tend to pull the two collars together, and no means is provided to resist this inevitable pull or keep a **separation** between the collars during movement of the fetlock joint, as in the present invention. BÖRENDT states that "In the

place of rubber, however, any elastic material may be used". There is no suggestion here that an *inelastic* material may be used, as in the present invention. There is no teaching of any tendon or ligament support while the horse is standing or when full load is applied to the fetlock joint, as in the present invention. BÖRENDT's device is completely ineffective at resisting fetlock joint movement, particularly at high speeds when joint movement is at its greatest. In fact, the tensile load exerted on the flexor tendons by the extension of the fetlock joint during a high-speed gallop will be between 1.5 and 2.0 tones. The elastic ring and strap arrangement taught by BÖRENDT simply would not have any significant effect in resisting such forces.

The problem with a horse boot comprising two collars connected together only by straps and an elastic connecting ring is that when used on horses exercising, the two collars will be pulled together by the tension exerted by the straps, and even more so by the elastic connector. This renders such a device ineffective even at very low speeds such as a walk. An aim of the present invention is to protect a horse at high-speed exercise, such as a gallop, when the risk of strain injury is greatest. Secondly, as the collars are pulled together, excessive pressure is concentrated onto the soft tissue around the horses joint which would cause bruising and inhibit proper blood circulation. With the introduction of a load-bearing hinge located over the

fetlock joint, designed to pivot concentrically with the fetlock joint, separation between the collars is maintained under load as described with reference to applicant's Fig. 5, for example. What happens in this embodiment of the present invention is that the tensile load exerted on the inelastic connecting piece or "artificial tendon" in tension may be opposed by the structural stiffness or inherent compression strength of the hinge in compression and transferred safely onto the front surfaces of the horse's leg.

CLEGG describes an arrangement with a first collar **a** which embraces the radius bone above the knee joint, and a second collar **a** which embraces the large metacarpal bone below the knee joint, connected together on one side only by two rigid steel bars that hinge about pivot **h**. It will be noted first of all that CLEGG's device is **not** attached above and below the horse's fetlock joint, to embrace the canon bone and the pastern bone, which the Examiner mistakenly asserts, but rather above and below the horse's knee. The purpose of CLEGG's arrangement is to prevent the horse's front legs from moving inwardly towards one another during trotting and knocking together. CLEGG does not teach tendon and ligament support of the fetlock joint, or even the knee joint. Moreover, the hinge described by CLEGG provides free rotation with no means to **limit** rotation of a joint within a predetermined range of pivot rotation, as in the present invention.

Neither BÖRENDT nor CLEGG teaches the claimed tendon and ligament **support** for a horse's fetlock joint. No **support** to the fetlock joint is provided, in the sense of load-bearing support to the fetlock joint itself. The purpose of the devices described by BÖRENDT and by CLEGG is in each case very different to that of the device of the present invention, which aims to positively support the tendons and ligaments by resisting fetlock joint rotation, across the range of joint movement, even at a gallop. BÖRENDT's design simply cannot prevent overextension of the fetlock joint because of its elasticity and inherent weakness of construction, and more importantly because it lacks the pivot arrangement of the present invention, essential to keep the collars apart during load. CLEGG aims to prevent sideways leg movement, and knocking together of the front legs, with no mention of preventing fetlock overextension or providing fetlock joint support.

In contrast, the present invention, as now claimed, provides an arrangement comprising,

"connection means for providing articulation and **separation** between the two collars, wherein the connection means is adapted to provide limited ligament and/or tendon elongation **under load**, and the connection means comprising, **in combination**,

a pivot arrangement for providing articulation and separation between the two collars, and

an essentially **inelastic** connector of **high tensile strength** connected to one or more points on each of said cannon bone-embracing collar and said pastern-bone-embracing collar arranged across the posterior side of the fetlock joint so as to limit

fetlock joint movement within a predetermined range of pivot rotation."

1) It would not have been obvious to the skilled person to replace the rubber ring of BÖRENDT with "an essentially inelastic connector" as claimed. BÖRENDT teaches the use of an elastic collar connector because of the stated need to give "free play to the sinew without in any way hindering, hurting, or cramping the same". As an alternative, BÖRENDT teaches the use of "any desired elastic material", and so teaches away from inelastic materials. There would be no natural motivation for the skilled person to try an inelastic connector, as that would tend to hinder or cramp movement beyond a certain point, which BÖRENDT says is not desired.

2) There was clearly no motivation for the skilled person to combine these two elements as the means for connecting the two collars, namely the elastic strap of BÖRENDT and the pivot of CLEGG. Both documents are over a century old - in the intervening 100-year period, no prior art document in the field of the invention has been shown to exist describing such a combination! That in itself demonstrates that the combining of these two elements, per se, would not have been obvious.

3) It would not have been obvious to the skilled person, seeking to design a fetlock joint support, to replace the hinge of CLEGG with a "resistance-exerting pivot arrangement" of JOUTRAS. CLEGG teaches a device to prevent an unnatural lateral

leg movement, arranged across a horse's knee joint; JOUTRAS teaches a human knee brace with a resistance to knee flexion and extension. The anatomy of a knee joint, whether in the horse or human, is completely different to a fetlock or ankle joint, to begin with. It is therefore not obvious that the skilled person, seeking to provide an improved tendon and ligament support for a horse's fetlock joint, would consider CLEGG or JOUTRAS as a starting point, let alone to combine these documents.

No combination of prior art documents cited by the Examiner, neither BÖRENDT + CLEGG, nor CLEGG + JOUTRAS, when taken together, contains any teaching or suggestion of the claimed "connection means ... adapted to provide limited ligament and/or tendon elongation **under load**, ... comprising, **in combination, a pivot** arrangement for providing articulation and separation between the two collars, and an essentially **inelastic** connector of **high tensile strength** connected to one or more points on each of said cannon bone-embracing collar and said pastern-bone-embracing collar arranged across the posterior side of the fetlock joint so as to limit fetlock joint movement within a predetermined range of pivot rotation".

There is nothing to be learned from any such combined teaching which would lead the skilled person to the combination of features claimed in the present invention, without inventive capacity. In particular, the cited art, and the cited combinations of documents, would not lead the notional skilled

person in the art to the actual mechanics of a pivot arrangement (aligned in use with the joint axis of rotation) in combination with an inelastic connector arranged to the posterior of the joint, and the synergistic way in which the two co-act in unison, as happens in the present invention. With the presently claimed arrangement, when the joint rotates, or extends, the pivot is loaded in compression by the considerable load-bearing forces applied by the weight of the horse in movement, providing support across its whole range of joint movement, while keeping a separation between the two collars. At the same time, the inelastic connector opposes the pivot and becomes loaded in tension, and bears first against the back of the leg, supporting the posterior of the leg, and finally when the slack in the connector is fully taken up, it prevents the collars from further pivoting apart and hence further joint extension.

None of these prior art documents even comes close to describing or suggesting applicant's combination or how the two elements (hinge and inelastic connector) co-act and work together, in the manner described above, which is clearly set forth in claim 21.

One of the advantages of the present invention is that the device can be worn by a horse to prevent strain injury to the delicate flexor tendon and suspensory ligaments surrounding the fetlock joint, and permit the horse to exercise safely without the risk of tendon and ligament strain. Tendon and ligament

strain injury is the most frequent injury in racehorses. Statistically, one in five racehorses retires prematurely as a result of such injury. Therefore, plenty of motivation would have existed for the skilled person to address the problems with the prior art devices and provide some inventive solution. However, the mechanism and the way the present invention works are nowhere to be found in any teaching in the available prior art. In view of the fact that the nearest prior art cited is actually over 100 years old, "long felt want" is more than evident. That is an indication that the invention as claimed in claim 21 could not have been obvious.

As the claims as amended clearly bring out these distinctions with ample particularity, it is believed that they are all patentable, and reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'Robert J. Patch', written over a horizontal line.

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